

We claim:

1. An apparatus for processing data streams comprising:
at least one producer of properly ordered substreams of a data stream;
5 a plurality of potential consumers of a data stream; and
a stream fabric, coupled to the producer and the potential consumers,
that operates to receive the substreams from the producer, store the substreams
within a stream queue associated with the data stream and output at least a
portion of the data within the stream queue to a consumer of the stream queue,
10 the consumer being one of the plurality of potential consumers.
2. An apparatus according to claim 1, wherein the stream fabric operating to
output at least a portion of the data within the stream queue to a consumer of
the stream queue comprises reading a consumer attribute for the stream queue
15 to determine an assigned consumer of the stream queue and outputting a
portion of the data within the stream queue to the assigned consumer.
3. An apparatus according to claim 1, wherein the stream fabric operating to
output at least a portion of the data within the stream queue to a consumer of
20 the stream queue comprises selecting one of the potential consumers as a
consumer for the stream queue based upon a predetermined criteria and
outputting a portion of the data within the stream queue to the selected
consumer.
- 25 4. An apparatus according to claim 3, wherein the predetermined criteria
comprises a round robin system.
5. An apparatus according to claim 3, wherein the predetermined criteria
comprises a determination of a least burdened potential consumer.

6. An apparatus according to claim 1, wherein the stream fabric further operates to receive a control signal associated with the stream queue from the consumer of the stream queue.

5 7. An apparatus according to claim 6, wherein the control signal comprises an indication of at least one consumer attribute for the stream queue.

8. An apparatus according to claim 7, wherein the consumer attribute comprises the potential consumer that is assigned as the consumer of the stream
10 queue.

9. An apparatus according to claim 7, wherein the consumer attribute comprises the number of bytes of the data within the stream queue that are to be
15 output to the consumer of the stream queue.

10. An apparatus according to claim 6, wherein the control signal comprises an indication of at least one attribute associated with the producer of the stream
20 queue.

11. An apparatus according to claim 6, wherein the control signal comprises an instruction to copy at least a portion of the data within the stream queue to
25 the consumer of the stream queue.

12. An apparatus according to claim 6, wherein the control signal comprises an instruction to forward at least a portion of the data within the stream queue
30 to the consumer of the stream queue and to subsequently delete the portion of the data within the stream queue.

13. An apparatus according to claim 6, wherein the control signal comprises an instruction to transfer at least a portion of the data within the stream queue
to another stream queue within the stream fabric.

14. An apparatus according to claim 1, wherein the producer is an Input/Output (I/O) element arranged to be coupled to a packet switched network.

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15. An apparatus according to claim 14, wherein the I/O element operates to receive a flow of data packets, each of the data packets representing at least one segmented portion of the data stream; to terminate the layer 4 protocol within the received data packets; and to output properly ordered substreams of the data stream to the stream queue associated with the data stream.

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16. An apparatus according to claim 15, wherein the I/O element operating to terminate the layer 4 protocol within the received data packets comprises removing the packet overhead from the received data packets, reordering the data within the received data packets into the proper order if necessary and requesting retransmission of any lost packets if necessary.

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17. An apparatus according to claim 1, wherein the consumer of the stream queue is a processing element.

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18. An apparatus according to claim 17, wherein the consumer of the stream queue is a content processing element that operates to receive the data output from the stream queue, process contents of the data received from the stream queue and transmit at least one control signal to the stream fabric in response to the processing of the contents of the data.

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19. An apparatus according to claim 18, wherein the at least one control signal comprises an instruction to change a consumer attribute of the stream queue such that the consumer of the stream queue is changed to another one of the potential consumers.

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20. An apparatus according to claim 19, wherein the other one of the potential consumers comprises an application processing element that operates to process the contents of the data received from the stream queue.
- 5 21. An apparatus according to claim 20, wherein the application processing element comprises an decryption processing element that operates to decrypt the data received from the stream queue and output the decrypted data to a second stream queue within the stream fabric.
- 10 22. An apparatus according to claim 19, wherein the other one of the potential consumers comprises an Input/Output (I/O) element coupled to a packet switched network, the I/O element operating to output the data within the stream queue to the packet switched network.
- 15 23. An apparatus according to claim 22, wherein, prior to the content processing element operating to transmit the control signal to the stream fabric, the content processing element further operates to add a flow context identifier to the stream queue associated with the data stream, the flow context identifier being used by the I/O element to select a flow within the packet switched
- 20 network to output the data within the stream queue on.
24. An apparatus according to claim 18, wherein the stream fabric comprises a plurality of stream queues and the content processing element is set as a default initial consumer of each of the stream queues within the stream fabric.
- 25 25. An apparatus according to claim 1, wherein the producer and one of the potential consumers are the same component.
26. An apparatus for processing streams of data comprising:
- 30 at least one producer of properly ordered substreams of a data stream;
a content processing element; and

a stream fabric, coupled to the producer and the content processing element, that operates to receive the substreams from the producer, store the substreams within a stream queue associated with the data stream and copy at least a portion of the data within the stream queue to the content processing
5 element;

wherein the content processing element operates to receive the data output from the stream queue, process contents of the data received from the stream queue and transmit at least one control signal to the stream fabric in response to the processing of the contents of the data.

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27. An apparatus according to claim 26 further comprising at least one consumer of a data stream; and

wherein the at least one control signal comprises an instruction for the stream fabric to forward further data from the stream queue to the consumer.

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28. An apparatus according to claim 27, wherein the consumer comprises an application processing element that operates to process the contents of the data received from the stream queue.

20 29. An apparatus according to claim 27, wherein the consumer comprises an Input/Output (I/O) element coupled to a packet switched network, the I/O element operating to output the data within the stream queue to the packet switched network.

25 30. A stream switch for directing, within a packet switched network, a data stream, the stream switch comprising:

an interface, arranged to be coupled to the packet switched network, that operates to receive and process a flow of data packets from the packet switched network, each of the data packets representing at least one segmented portion of
30 the data stream, and to output properly ordered substreams of the data stream;

a stream fabric that operates to receive the substreams from the interface and store the substreams within a stream queue associated with the data stream; and

5 a content processing element that operates to receive a copy of at least a portion of the data within the stream queue, process contents of the data received from the stream queue and instruct the stream fabric to direct the data within the stream queue to a selected flow of packets within the packet switched network, via the interface, in response to the processing of the contents of the data.

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31. An apparatus for processing data streams comprising:
production means for producing properly ordered substreams of a data stream;

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a plurality of consumption means for consuming a data stream;
storage means for storing the substreams; and
output means for outputting at least a portion of the data within the storage means to one of the consumption means.

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32. A method of processing a data stream comprising:
producing properly ordered substreams of a data stream;
storing the substreams within a stream queue associated with the data stream; and

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outputting at least a portion of the data within the stream queue to a consumer of the stream queue, the consumer being one of a plurality of potential consumers.

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33. A method according to claim 32, wherein the producing properly order substreams of a data stream comprises receiving a flow of data packets, each of the data packets representing at least one segmented portion of the data stream; and terminating the layer 4 protocol within the received data packets.

34. A method according to claim 33, wherein the terminating the layer 4 protocol within the received data packets comprises removing the packet overhead from the received data packets, reordering the data within the received data packets into the proper order if necessary and requesting
5 retransmission of any lost packets if necessary.
35. A method according to claim 32, wherein the outputting at least a portion of the data within the stream queue to a consumer of the stream queue comprises processing contents of at least a portion of the data within the stream
10 queue, determining which of the potential consumers to select as the consumer for the stream queue based upon the contents of the at least a portion of the data within the stream queue and outputting at least a portion of the data within the stream queue to the selected consumer.
- 15 36. A method according to claim 35 further comprising processing the data received from the stream queue at the selected consumer of the stream queue.
37. A method according to claim 36, wherein the processing the data received from the stream queue comprises decrypting the data received from
20 the stream queue and storing the decrypted data within a second stream queue.
38. A method according to claim 36, wherein the processing the data received from the stream queue comprises outputting the data received from the stream queue to a packet switched network.
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39. A method of processing a data stream comprising:
producing properly ordered substreams of a data stream;
storing the substreams within a stream queue associated with the data stream;

processing contents within at least a portion of the data within the stream queue to determine one of a plurality of potential consumers to select as a consumer of the stream queue; and

- outputting at least a portion of the data within the stream queue to the
5 selected consumer of the stream queue.